

KUMHO Latex

Styrene - Butadiene / Acrylonitrile - Butadiene Latex

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KUMHO PETROCHEMICAL

Latex Sales Team

TEL 82-2-6961-1681~4

FAX 82-2-6961-1699

R&BD CENTER Latex Application Team

TEL 82-42-865-8661~3, 8652-9

FAX 82-42-863-0885

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LATEX for Cement Mortar and Concrete

I. Cement Mortar Latex

This product is suitable for surface coating to be used as a reinforcing agent for cement mixture that is widely used in constructions. It is used for waterproofing in housetop, bathhouse, toilet as well as for corrosion protecting in deck, steel frame, steel plate, etc.

KUMHO KSL362, 3301, 363

■ Applications

- _ Concrete repair mortar
- _ Deck pave concrete
- _ Special concrete
- _ Durability concrete
- _ Improved adhesion of mortar
- _ Increase of abrasion resistance
- _ Reduced shrinkage of mortar
- _ Waterproofing of mortar
- _ LMC (latex modified concrete)

■ Advantage

- _ Excellent durability
- _ Very good chemical resistance
- _ Water-cement ratio reduce
- _ Strong binding force sustenance in general mortar, concrete, metal, wood, etc

■ Typical Properties

Latex	KSL 362	KSL 3301	KSL 363
Appearance	Milky white	Milky white	Milky white
Viscosity at 25°C(cps)	130	110	300
Total solid contents(%)	48,5	46,5	46,0
pH(25°C)	9,7	9,0	9,3
S/T(dyne/cm)	39	41	29
Use	PCM	PCM	LMC



LATEX for Paper Coating

II. Paper Coating Latex

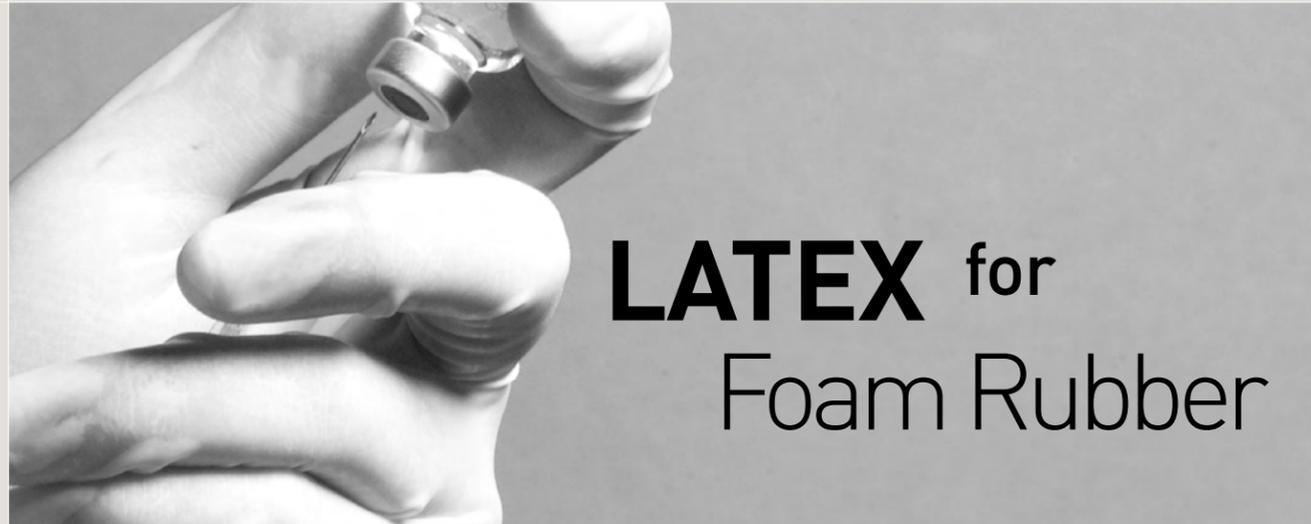
The purpose of the paper coating is the improvement of both the apparent paper properties and printability such as paper smoothness, apparent gloss, picking strength and printing gloss. As one of the ingredients used in the paper coating, the latexes are used to bind the pigments to the coating layer of the raw paper during the drying process. Additionally, they increase fluidity of the coating formula.

KUMHO KSL202, 203, 215, 220, 252, 2111, 2601

■ Properties of the paper coating latexes

Latex	KSL 203	KSL 202	KSL 215	KSL 220	KSL 252	KSL 2111	KSL 2601
Use	Web off-set	Sheet off-set					
Solid(%)	50	48	50	50	50	50	50
pH(25°C)	8,5	8	8	8	8	8	8
S/T(dyne/cm)	55	55	55	56	54	42	52
Viscosity(cps)	Max.200	Max.200	Max.400	Max.400	Max.450	Max.400	Max.450
Tg(°C)	11	-2	-1	6	0	-3	-6
P/S(Å)	1,700	1,700	1,600	1,400	1,250	1,300	1,600

Note) Values are typical, but there may be a slight difference between the elements of a supplied product and data.



LATEX for Foam Rubber

III. Foam Rubber Latex

KSL 341 is the high-solid non-carboxylated styrene-butadiene co-polymerized latex. It has outstanding foam stability to be used as a binder for foam rubber, foam backing and fabrics by its own. It can also be used as various reinforcing agents in impact resistance.

KUMHO KSL341, KSL3420

- **Main Use**
 - _ Foam rubber
 - _ Foam backing
 - _ Reinforcing resin impact resistance

- **Characteristics**
 - _ Foam forming by itself
 - _ Excellent foam stability

■ **Properties**

Latex	KSL 341	KSL 3420
Solids(%)	69.0	67.0
pH(25°C)	10.5	10.0
S/T(dyne/cm)	34	35
Viscosity(cps)	<800	<800



LATEX for Carpet Backing

IV. Carpet Backing Latex

KSL 100 series are carboxylated styrene butadiene co-polymerized latexes. Their aging resistance, weather resistance, good processability and high binding force provide excellent opportunities for carpet backing process. They are also suitable as a binder for non-woven fabrics, dipped goods and backing for furniture fabrics.

KUMHO KSL106, KSL108, KSL220

- **Main Use**
 - _ Fabrics binder, non-woven binder
 - _ Various fabrics treatment, dipping product
 - _ Album binder

- **Characteristics**
 - _ High binding force
 - _ Good processability
 - _ Aging resistance
 - _ Good foaming

■ **Properties**

Latex	KSL 106	KSL108	KSL220
Solids(%)	48	52	50
pH(25°C)	8.0	8.0	8
S/T(dyne/cm)	57	52	56
Viscosity (cps)	190	<600	<400
Tg(°C)	-16	+6	6
P/S(Å)	1,700	1,500	1,400



V C-NBR Latex

KNL 850 is a carboxylated acrylonitrile butadiene copolymerized latex. It is designed for the manufacture of abrasive paper, fabric coating and non woven binding.

KUMHO KNL850

- **Main Use**
 - _ Abrasive paper
 - _ Fabric coating
 - _ Non woven binding

- **Characteristics**
 - _ Good miscibility with phenolic resin and resistance to hydrocarbon, oils
 - _ Excellent abrasion resistance, tear and elongation properties and high tensile strength

- **Properties**

Latex	KNL 850
Solids(%)	40
pH(25°C)	8,0
S/T(dyne/cm)	36
Viscosity(cps)	30

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KUMHO LATEX for Glove Dipping

Acrylonitrile - Butadiene Latex

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Contents

NB Latex for Glove Dipping	01
KUMHO KNL 830	01
KUMHO KNL 860	04
KUMHO KNL 870	06
KKPC R&BD CENTER	08





NB Latex for Glove Dipping

KKPC NB Latex is carboxylated butadiene acrylonitrile copolymer designed for Nitrile gloves by coagulant dipping processes

KUMHO KNL 830

■ **Main Use** _ Disposable nitrile gloves

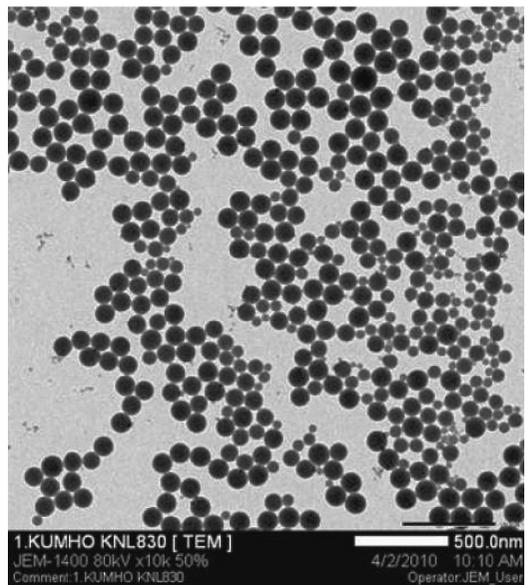
■ **Characteristics** _ High tensile strength
 _ High tear strength
 _ High durability
 _ Excellent for strong, thin and soft gloves

■ **Typical properties**

	KNL 830	Test Method
Solids (%)	45.0	ASTM D 1417
pH	8.6	ASTM D 1417
Viscosity (mPa·s)	80	ASTM D 1417
Surface Tension (mN/m)	33	ASTM D 1417
Particle size (nm)	120	ASTM D 1417
Tg (°C)	-30	
Gel contents* (%)	0	ASTM D 3616
ACN contents (%)	27	

*) Solvent : Methyl ethyl ketone (MEK)

■ **TEM Observation**



■ **Compounding formulation & Dipping procedure**

(dry parts)

Dipping Compound	(phr)
KNL 830	100
KOH (or NH ₄ OH)	to adjust pH 10.0
Curing agent	
Sulfur	0.5 ~ 1.5
ZnO	1.2 ~ 2.1
ZnDEC	0.25 ~ 0.50
TiO ₂	1.0 ~ 1.5
Dispersant	0.3
Total solids contents(%)	20

- a) KOH (or NH₄OH) was added to adjust final compound pH 9.8 ~ 10.2
- b) ZnBDC is Zinc di-n-butyl dithiocarbamate
- c) 20% Ca(NO₃)₂ aq. solution is used for coagulant

1. Former washing and pre-warming (70°C)
2. Coagulant dipping (20 sec.)
3. Dry coagulant (70°C, 2 min.)
4. Compound dipping (20 sec.)
5. Dry compound (80°C, 5 min.)
6. Beading
7. Leaching (50°C, 2 min.)
8. Dry at room temperature
9. Curing the dry film (120°C, 20 min.)
10. Strip film from the former

■ **Application properties**

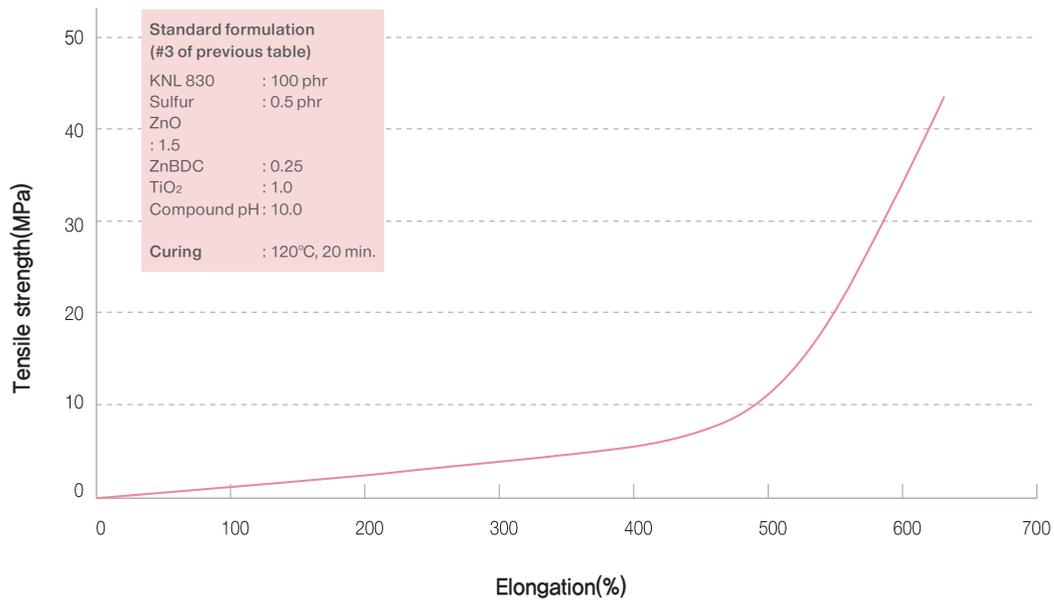
	1	2	3	4	5	6	7	8	9	10	11
Compounding Formulation											
Sulfur (phr)		0.5			0.5	0.8	1.2	1.6		0.5	
ZnO		1.5				1.5			1.0	1.5	2.0
ZnBDC		0.25				0.25				0.25	
TiO ₂		1.0				1.0				1.0	
Compound pH	9.5	9.8	10.0	10.2		10.0				10.0	
Physical properties of Glove											
Thickness (mm)											0.10
M300 (Mpa)	3.5	3.8	4.0	4.0	4.0	3.9	4.1	4.3	3.8	4.0	4.1
M500 (Mpa)	8.9	10.4	11.2	11.8	11.2	11.3	11.7	12.4	10.5	11.2	11.2
Tb (Mpa)*	37.8	39.6	43.4	40.4	43.4	43.6	45.2	47.0	42.9	43.4	43.6
Elongation (%)	586	602	630	641	630	628	636	636	621	630	624

*) Tb : Tensile strength at break

KUMHO KNL 830

■ Application properties

_ stress and strain curve of standard formulation



Thickness (mm)	M300	M500	Tb (MPa)	Elongation (%)
0.10	4.0	11.2	43.4	630

■ Application properties

_ chemical stability of compounds

Compound formulation	(phr)
KNL 830	100
Sulfur	0.5
ZnO	1.5
ZnBDC	0.25
TiO ₂	1.0
Compound TSC(%)	20

Test method of chemical stability

- 1) Filter 10 kg of latex compounding (by 200 mesh)
- 2) With stirring the latex by 200 rpm, add 100g of Ca(NO₃)₂ (0.5% aqueous solution)
- 3) After 24 hrs, filter the solution by 200 mesh, then calculate coagulum content

NB LATEX for Glove Dipping



KUMHO KNL 860

■ Description

This is an aqueous, colloidal dispersion of a carboxylated butadiene-acrylonitrile copolymer with a medium acrylonitrile level designed for industrial gloves.

It contains an anionic emulsifier system and is stabilized with an antioxidant.

■ General Characteristics

Good resistance to oils, petrol and plasticizers

Low modulus(soft) & high elongation

High abrasion resistance

High chemical stability

■ Applications

Supported Gloves for Industrial

Thick Disposable Gloves

Unsupported Gloves for Household

■ Typical Properties

	unit	KNL860	Test Method
Total Solids Content	%	45	ISO 1242008
pH		7.9	ISO 976:1995
Viscosity@25°C, 60 rpm	mPa·s	60	ISO 1652:2004
Surface tension	mN/m	33	ISO 1409:1995
Particle size	nm	140	ISO 22412:2008
ACN contents		medium	

■ Film Properties for Thick Disposable Glove



Dipping Compound	(phr)
KNL860	100
KOH (or NH ₄ OH)	to adjust pH 10.0
Curing agent	
Sulfur	1
ZnO	1.4
ZnDEC	0.5
TiO ₂	1
Total solids contents(%)	25

- 1) Single dipping(20sec), film thickness : 0.11~0.13mm
- 2) 25% Ca(NO₃)₂ aq. Solution is used for a coagulant

■ Abrasion Resistance for Industrial Supported Glove

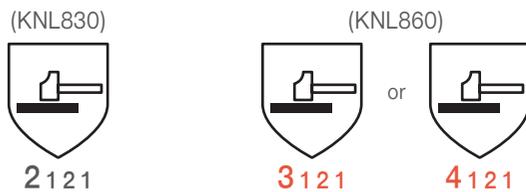
EN388 Standard

GLOVES GIVING PROTECTION FROM MECHANICAL RISKS

Protection against mechanical hazards is expressed by a pictogram followed by four numbers (performance levels), each representing test performance against a specific hazard.

Physical Properties for supported gloves	Performance Level				
	1	2	3	4	5
Abrasion resistance (cycles)	100	600	2000	8000	
Blade cut resistance (factor)	1.2	2.5	5	10	20
Tear resistance (newton)	10	25	50	75	
Puncture resistance (newton)	20	60	100	150	

(Please refer to the reference)



Note)

KNL860 is designed for industrial glove enhancing the abrasion resistance.

* It depends on the glove type, formulations and dipping conditions.

NB LATEX for Glove Dipping



KUMHO KNL 870

■ Description

This is an aqueous, colloidal dispersion of a carboxylated butadiene-acrylonitrile copolymer with a high acrylonitrile level designed for household and industrial gloves.

It contains an anionic emulsifier system and is stabilized with an antioxidant.

■ General Characteristics

Excellent resistance to oils, petrol and plasticizers

Good modulus & tensile strength balance

High chemical stability against Ca^{2+} ion

■ Applications

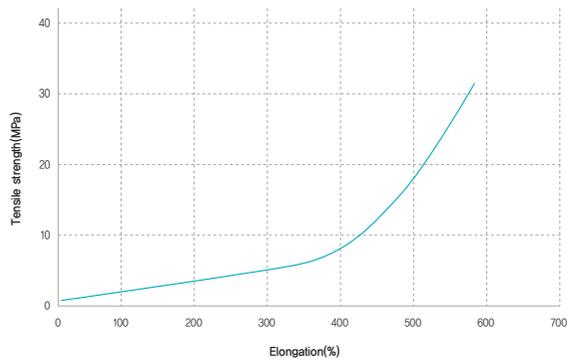
Unsupported Glove for Household and Industry

Thick Disposable Gloves

■ Typical Properties

	unit	KNL870	Test Method
Total Solids Content	%	45.0	ISO 1242008
pH		8.2	ISO 976:1995
Viscosity@25°C, 60 rpm	mPa·s	90	ISO 1652:2004
Surface tension	mN/m	33	ISO 1409:1995
Particle size	nm	130	ISO 22412:2008
ACN contents		high	

■ Film Properties for Thick Disposable Glove



Dipping Compound	(phr)
KNL870	100
KOH (or NH ₄ OH)	as required
Sulfur	1.0
ZnO	1.8
ZnDBC	0.5
TiO ₂	1.0
Thickener (Methyl cellulose)	0.2
Total solids contents(%)	36

- 1) Compound pH: 9.0, viscosity: 210cps
- 2) Single dipping(10 sec)
- 3) Film thickness : 0.20mm
- 4) Coagulant : 28%Ca(NO₃)₂aq. Solution

■ Chemical Resistance for Household Glove (based on EN374)



Performance level	Measured Breakthrough Time
Level 1	>10 min
Level 2	>30 min
Level 3	>60 min
Level 4	>120 min
Level 5	>240 min
Level 6	>480 min

code	chemical	KNL 870	
		MBT(min.)	level
J	n-heptane	>480	6
K	Sodium hydroxide (40%)	>480	6
L	Sulfuric acid (96%)	48	2

Formulation : S/ZnO/ZnBDC/TiO₂ = 1/1.8/0.5/1 (phr)
 Thickness : 0.23mm



Whole dipping process proceeded by Dipping Instrument of
KKPC R&BD CENTER

■ **Handling and Storage**

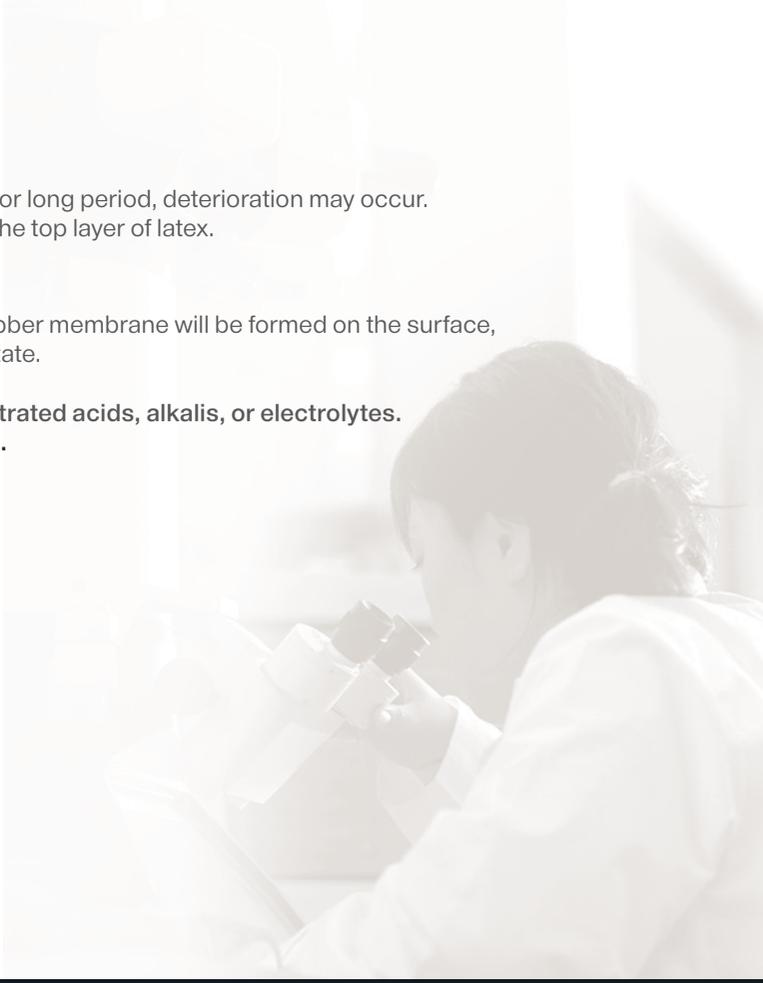
Store between 5°C to 45°C.

If frozen or stored at temperature above 60°C for long period, deterioration may occur.
Agitate frequently, If not, creaming occurs on the top layer of latex.

Always store in a closed container or vessel.

If significant evaporation of water occurs, a rubber membrane will be formed on the surface,
which will not return to the original emulsion state.

Prevent from being contaminated by concentrated acids, alkalis, or electrolytes.
Such contamination make the latex unstable.





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